Science Forward Online 2020 – ANNOTATED SYLLABUS

Macaulay Honors College Seminar 3

Welcome to the annotated syllabus for use as example of a Fall 2020 online Science Forward course at Macaulay. In the event that we are fully online for the fall, we are asking our seminar instructors to keep at least 60 min of their scheduled class time as a synchronous online meeting. This syllabus reflects that directive. It is a combination of the best aspects of our current in-person Science Forward course and the lessons we learned from the asynchronous Science Forward course taught at Macaulay in Fall 2017. This syllabus has been annotated with comment boxes in the margin. Please view this document in Word to make sure that you can see these comments.

**Course Information**

MHC 20301 – HNR (55549) at City College

Online, synchronous

Wednesdays 9:30am-10:45am

**Instructor Information**

Professor: Dr. Kelly O’Donnell – [kelly.odonnell@mhc.cuny.edu](mailto:kelly.odonnell@mhc.cuny.edu)

Office Hours: Mondays from 9:30am-10:45am in this Google Meet room [LINK] or send an email for an appointment.

TLC: Dr. Kelly Eckenrode – [kelly.eckenrode@sph.cuny.edu](mailto:kelly.eckenrode@sph.cuny.edu)

TLC Office Hours: Send an email to make an appointment

**Course Description**

Science Forward is a skills-based course that focuses on scientific thinking in the context of a variety of different fields of life and physical science. We will focus on the specific skills that allow one to have good Science Sense. These skills fall into broad categories: Number Sense, Data Sense, and Knowledge Sense.

Science Sense is…

* being able to distinguish science from non-science.
* the ability to recognize how people collect and process facts into knowledge.
* the ability to recognize how a collection of facts becomes knowledge.
* being able to question and evaluate information that is presented as scientific.
* being an informed consumer, evaluator, and practitioner of science.

**Student Learning Outcomes**

Students will hone their Science Sense skills during this course. Specifically, students will:

* Develop a sense of scale and calculate order of magnitude estimates with reasonable assumptions.
* Collect and analyze scientific data taken during activities in the field (including a BioBlitz common event) and be able to create and communicate their results visually in a research poster (presented at our STEAM Festival common event).
* Describe and utilize aspects of good experimental design (replication, reproducibility, proper sample choice, controls, etc.) and scientific inquiry in multiple fields of science.
* Describe how science makes progress and changes through time based upon newly available evidence.
* Distinguish science from pseudoscience using critical thinking skills and employing reasonable skepticism.
* Communicate science to scientific and non-scientific audiences through three major assignments.
* Leave this course with an appreciation for the similar set of skills employed by scientists in seemingly disparate fields of scientific inquiry and recognize that these skills are not only applicable to their coursework, but also to their daily lives.

**Course Structure**

This course is fully online and runs in a particular sequence (see table below). Each week has a module on our course site that features required videos and readings and assignment details for successful completion of each week. If you have questions about how the course works, feel free to use our “Q&A” discussion forum. If you found something fun and science related that you want to share with your classmates, make a post in the “Ten Forward” discussion forum. We will be having weekly synchronous meetings during your regularly scheduled class time on Wednesdays. During the semester, you will be working both individually and in groups that are set up by me.

The course will have several environments in which you and your classmates will interact.

* Google Meet – [LINK] – This is where we will have our weekly synchronous meetings. These meetings will not be lectures. You should expect to be involved in activities and discussions during these meetings.
* Course Site – [LINK] – Our course site is where you will find all of the information you need to successfully complete this course. It features our Discussion Forum, where you will a weekly (text-based, asynchronous) discussion.
* Slack Team – [LINK] – We will have a Slack team for more informal discussion and reminders. You can also use this to chat with your group about projects.

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| **Week** | **Field of Scientific Inquiry** |
| 1 | Philosophy of Science |
| 2 | Astronomy |
| 3 | Geology |
| 4 | Climate Change |
| 5 | Urban Ecology |
| 6 | Evolution |
| 7 | Agricultural Science |
| 8 | Water |
| 9 | Energy |
| 10 | Neuroscience |
| 11 | Intelligence |
| 12 | Drug Discovery & Design |
| 13 | Poster Practice |
| 14 | Medicine & Pseudomedicine |
| 15 | Science & Society |

Good time management and organization is always important in your courses, but in an online course it is essential. Because we won’t be seeing each other in person, some of the traditional in-class cues for your work will be missing. It is strongly recommended that you set aside a little time each day of the week to work on this course. Don’t save all your work for the end of the week when assignments are due. There is an example of a personal schedule later in this syllabus.

**Week Schedule**

The specific fields of science that we explore each week will be the context for our Science Sense training. We roughly follow a scale order from large (studying the cosmos) to small (studying molecules).

**What You Can Expect From Me**

Like you, I will be making time each day to pop into the course site and monitor activity. Every Wednesday, I will see you in our Google Meet classroom and orient you to the week ahead. I will facilitate in class discussions and activities for the week. Every Monday, I’ll be available for office hours. On Fridays, I’ll send you an email summarizing the week ahead. If you have questions about an assignment, try the Q&A forum first because it is likely that you are not the only one with that question. If you have specific questions about your progress that you don’t want to share with the class, the best way to get a hold of me is via email. Please put the name of our course (MHC 20301) in the subject line along with your name. I will usually respond to emails within 24 hours (but longer if it is over the weekend).

**Required Text**

O’Donnell KL, LA Brundage, and J Ugoretz (executive producers). 2019. Science Forward Video Series. *Science Forward OER.* URL: <http://cuny.is/scienceforward>. These freely available videos serve as the backbone content for the course (they are labeled as “**SF video**” in the reading list below). We will also be using chapters from free online textbooks, primary scientific literature available in the CUNY libraries and/or popular press articles and videos. Links and citation information will be available on our course site. No book needs to be purchased for this course.

**Academic Integrity**

Academic dishonesty is unacceptable and will not be tolerated. Cheating, forgery, plagiarism and collusion in dishonest acts undermine the educational mission of the City University of New York and the students' personal and intellectual growth. You are expected to know and follow the guidelines put forth in the Macaulay Honors Pledge (available [here](http://macaulay.cuny.edu/community/handbook/policies/honors-integrity/)) and CUNY’s Policy on Academic Integrity (available [here](http://www2.cuny.edu/wp-content/uploads/sites/4/page-assets/about/administration/offices/legal-affairs/policies-procedures/Academic-Integrity-Policy.pdf)).

**Required Assignments**

Detailed instructions for the major assignments (essay, video, poster) and rubrics for all assignments can be found on the course site.

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| **ASSIGNMENTS** | **Percent of Final Grade** |
| Self-Assessment & Status (weekly, individual) | 5 |
| Discussion Forum (weekly, individual) | 15 |
| Activity Report (weekly, individual) | 15 |
| Science in the City Assignment (once, individual) | 5 |
| News Essay (once, individual) | 10 |
| Video Project (once, group) | 20 |
| Research Poster Project (once, group) | 30 |

*Weekly Self-Assessments & Status Report:*These are 7 question forms that you are required to complete but are ungraded. Five of the questions will be on the required readings/video content for the week. These questions are for you to make sure you’ve understood the main points of the week. If you haven’t gotten all five correct, you should go back and make sure that you do before completing the rest of the week’s work. The last two of the questions are a way for you to check in with me every week to let me know if anything was particularly challenging that week. There will always the option to choose “Nothing to report” in the form. These will become especially useful when you are doing group work. You should let me know if there are some group dynamics that you need help with.

You will get credit for doing all of these on time, regardless of what you “score” on them. These assessments are for you to make sure you’ve understood the main points of the week. If you haven’t gotten all five of the content questions correct, you should go back and make sure that you do before completing the rest of the week’s work.

*Weekly Discussion Forum:*Each week, students will be required to post in the Discussion Forum and respond to your classmates’ posts (you must make at least TWO substantive comments each week). Please complete the self-assessment first before entering the discussion on the Discussion Forum.

*Weekly Activity Reports:*Each week, students will engage in some sort of activity and be required to report on it. The activities may be online simulations, data analysis, blog posts, etc. Activity Reports will be uploaded to the course site. Instructions for each week’s activity can be found on the week’s page.

*Science in the City Assignment:* This assignment is a one-time blog post after you attend a free public science activity somewhere off campus at any time before the last day of class. These may be lectures, book talks, citizen science events, etc. I will have a list on our site for options and you can also propose events that you happen to find as long as they are off campus, free, and about science. If you choose an event not on our list, it MUST be approved by me BEFORE you go.

*News Essay:* Your first major assignment is an essay that reports on a scientific finding as if you were writing for a newspaper. You will choose one peer-reviewed science article from the past two years and write it up as the latest news for the Science section of this newspaper. You cannot choose an article that has already been covered heavily in the popular press (including blogs). The word count should be between 400-500 words and the assignment will be graded on a 4-point scale.

*Video Project:* For this group project, you will create a video in the style of one of our Science Forward custom videos. These won’t be as long as ours, but your goal would be similar – explain a single scientific concept and an important science skill needed to study that concept. You will need to choose a topic not already covered by one of our videos. This will be graded on a 4-point scale.

*Research Poster Project:*The semester research poster project is the largest portion of your grade. You and your group are to come up with a research question about the BioBlitz and test it using BioBlitz data and/or additional data that you collect during the semester. The final output is a research poster to be presented at the end of semester conference. This project will be a large undertaking and so it is broken down into smaller parts that are due throughout the semester. The project will be graded on a 4-point scale.

**Accessibility and Accommodation**

To the best of our ability, materials used in this course should be accessible to you. Videos in the Science Forward Video Series have closed captioning (when viewed via YouTube), written transcripts, and are available with audio descriptions of the visual content. If you are having trouble accessing any of the assigned readings or videos, do not hesitate to let me know and I will try to fix the issue.

Please make an appointment to see me if you have a disability that requires accommodation for participation in this course. I will make every effort to accommodate your needs. Students with disabilities are also encouraged to contact the [CCNY AccessAbility Center](https://www.ccny.cuny.edu/accessability) for additional assistance.

**Online Etiquette Anti-Harassment Statement**

In order to maintain an environment conducive to personal and intellectual growth, harassment of any kind is prohibited in our classroom and on our course site. CCNY’s Office of Affirmative Action, Compliance, and Diversity has additional policy information [here](https://www.ccny.cuny.edu/affirmativeaction). CUNY’s policy on sexual misconduct can be found [here](http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf).

The University strictly prohibits the use of University online resources or facilities, including our course site, for the purpose of harassment of any individual or for the posting of any material that is scandalous, libelous, offensive or otherwise against the University’s policies. For online interactions that happen through our course, we will follow the CUNY School of Professional Studies guide to an online academic setting available [here](http://catalog.sps.cuny.edu/content.php?catoid=2&navoid=205).

**Personal Schedule**

Each week will have a detailed page on the course site. All weekly deadlines are on Fridays at 5pm with the exception of comments on your classmates’ posts in the Discussion Forum, which are due on Mondays at 5pm. The comments are due on Mondays because I realize that, once or twice, you may not get the discussion in until right before the deadline and I want to give your classmates a chance to engage in a conversation with your posts. Before we get into the specific weekly topics, you may find it helpful to follow this personal schedule below. You can adjust this to suit your needs, but I highly recommend setting up a schedule similar to this one as soon as you can when the semester starts. Online courses require you to be very good at managing your own time.

*Recommended Personal Schedule*

Monday/Tuesday – Read/watch required papers and videos and take the self-assessment

Wednesday – Our class meets, make a discussion post

Thursday – Work on Assignments (including activities and major assignments)

Friday – Complete the assignments for the week

Saturday/Sunday – Read your classmates’ posts and make your (at least) two comments.

**Weekly Schedule of Topics and Assignments**

Readings may be changed, but you will be notified at least two weeks in advance of any changes. Links in this syllabus are active, but some of your readings will require you to go to the course site and enter a password.

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| **Week** | **Topic/Skills** | **Video/Reading** | **Assignment** |
| 0 | **Course Intro & Orientation** | 1. **Reading:** The course syllabus 2. **SF video:** [The Science Senses](https://youtu.be/9Ol1c7FSl-Q) | * **Self-Assessment 0** * **Discussion 0** * **Activity 0** – Student Survey |
| 1 | **Philosophy of Science**  **KS:**  Nature of Science, Communicating Science, Peer-review | 1. **SF video:** [What is Science?](https://youtu.be/u1zYdsr_Sn8) 2. **SF video:** [Science and Ethics](https://youtu.be/h9kKBaZNz60) 3. **Reading:** The University of California Museum of Paleontology, and the Regents of the University of California. 2017. “[Nature of Science](http://evolution.berkeley.edu/evolibrary/article/nature_01)” chapter in *Understanding Evolution* OER. (There are 7 pages to click through) | * **Self-Assessment 1** * **Discussion 1** * **Activity 1** – Essay citation |
| **Week** | **Topic/Skills** | **Video/Reading** | **Assignment** |
| 2 | **Astronomy**  **NS:**  Estimation, Sense of Scale  **DS:**  Proxies  **KS:**  Asking Scientific Questions | 1. **SF video:** [Tools of Seeing](https://youtu.be/7pIuD-veSBM) 2. **SF video:** [Astronomy](https://youtu.be/svx0lq_ILOQ) 3. **Reading:** Ch 1: Science and the Universe: A Brief Tour *from* OpenStax, [*Astronomy*](https://openstax.org/details/books/astronomy). 13 Oct 2016. 4. **Reading:** Billings. 2014. Astronomers Search for Moons Circling Distant Exoplanets. *Scientific American.* 310(1).   **OPTIONAL Reading:** Chapter 2: Numbers and Physical Reality *from* White and Dennin. 2008. [Science Appreciation: Introduction to Science Literacy](http://www.compadre.org/portal/document/ServeFile.cfm?ID=2171). READ ONLY sections 2-A and 2-B (pgs. 17-38). | * **Self-Assessment 2** * **Discussion 2** * **Activity 2 –** estimates and exoplanets |
| 3 | **Geology**  **KS:**  Nature of Science | 1. **SF video:** [Geology](https://youtu.be/2pNB2Etq2YA) 2. **Reading:** Cleland C. 2001. Historical science, experimental science, and the scientific method. *Geology.* 29(11):987-990. 3. **Reading:** Valley JW. 2005. A Cool Early Earth? *Scientific American* | * **Self-Assessment 3** * **Discussion 3** * **Activity 3 –** Essay worksheet |
| 4 | **Climate Change**  **NS:**  Sense of Scale  **DS:**  Proxies, Data Analysis, Interpreting Graphs, Uncertainty  **KS:**  Modeling | 1. **SF video:** [Climate Change](https://youtu.be/LKHqU0MAYdE) 2. **SF video:** [Scientific Uncertainty](https://youtu.be/Icw5BvMQG8k) 3. **Reading:** Riebeek. 2011. The Carbon Cycle. *NASA Earth Observatory.* [*https://earthobservatory.nasa.gov/Features/CarbonCycle/*](https://earthobservatory.nasa.gov/Features/CarbonCycle/) 4. **Reading:** Ch 19: Climate Change *from* Earle. 2015. Physical Geology. <https://opentextbc.ca/geology/chapter/chapter-19-climate-change/>   **OPTIONAL Reading:** Hansen et al. 2012. Perception of climate change. *PNAS.* E2415-E2423.  **OPTIONAL Reading:** Cox et al. 2000. Acceleration of global warming due to carbon-cycle feedbacks in a coupled climate model. *Nature*. 408:184-187.  **OPTIONAL Reading:** Hansen. 2004. Defusing the Global Warming Time Bomb. *Scientific American.* | * **Self-Assessment 4** * **Discussion 4** * **Activity 4** – Poster question |
| **Week** | **Topic** | **Video/Reading** | **Assignment** |
| 5 | **Urban Ecology**  **NS:** Making estimates  **KS:**  Asking Scientific Questions, Designing Experiments, Making Progress in Science | 1. **SF video:** [Urban Ecology](https://youtu.be/r8LPjvk7f7c) 2. **Video:** [Bozeman Science: Biodiversity](http://www.youtube.com/watch?v=0-PE3ve3w2w). 3. **Video:** TED talk: [Sukhdev - What is the price of nature?](http://www.ted.com/talks/pavan_sukhdev_what_s_the_price_of_nature.html) 4. **Video:** [SciShow: The Times and Troubles of the Scientific Method](https://www.youtube.com/watch?v=i8wi0QnYN6s) 5. **Reading:** Chapter 44: Ecology and the Biosphere *from* OpenStax, *Biology*. OpenStax. 21 October 2016.   *One of the following (6-7) will be assigned to you:*   1. **Reading:** Helden and Leather. 2004. Biodiversity on urban roundabouts—Hemiptera, management and the species–area relationship. *Basic and Applied Ecology.* 5:367-377. 2. **Reading:** Cheptou PO, O Carrue, S Rouifed & A Cantarel**.** 2008.[Rapid evolution of seed dispersal in an urban environment in the weed *Crepis sancta.*](http://www.pnas.org/content/105/10/3796.full.pdf) *PNAS.* 105(10):3796-3799.   **OPTIONAL Reading:** Costanza et al. 1997. The value of the world’s ecosystem services and natural capital. *Nature.* 387:253-260.  **OPTIONAL Reading:** Cardinale et al. 2012. Biodiversity loss and its impact on humanity. *Nature.* 486:59-67. | * **Self-Assessment 5** * **Discussion 5** * **Activity 5 –** Essay due |
| 6 | **Evolution**  **DS:**  Visualizing Data, Analyzing Data  **KS:**  Nature of Science, Communicating Science, Applying Scientific Knowledge | 1. **SF video:** [Evolution](https://youtu.be/pHQxVh_kEBY) 2. **Reading:** Darwin 1859. Selections from the first four chapters of the Origin 1859. 3. **Reading:** Palumbi, SR. 2001. Humans as the world’s greatest evolutionary force. *Science.* 293(5536):1786-1790. 4. **Reading:** Harris M, G Taylor, & J Taylor. 2007. *CatchUp Math and Statistics for the Life Sciences*. New York: WH Freeman and Company. Ch. 28 and 29. | * **Self-Assessment 6** * **Discussion 6** * **Activity 6 –** Poster proposal |
| **Week** | **Topic** | **Video/Reading** | **Assignment** |
| 7 | **Agriculture**  **NS:** Sense of Scale, Estimates  **DS:** Analyzing Data, Data Viz,  Uncertainty  **KS:** Making Evidence-based Arguments | 1. **SF video:** [The Challenge of Food](https://youtu.be/AwQZdJM3s90) 2. **Reading:** Godfray *et al.* 2010. [The challenge of feeding 9 billion people](http://www.sciencemag.org/content/327/5967/812.short). *Science.* 3. **Video:** Jonathan Foley TED talk: [The other inconvenient truth](http://www.ted.com/talks/jonathan_foley_the_other_inconvenient_truth.html) 4. **Reading:** Freedman, DH. 2013. Are engineered foods evil? *Scientific American*. Pgs. 80-85 | * **Self-Assessment 7** * **Discussion 7** * **Activity 7 –** Video outline |
| 8 | **Water**  **NS:**  Estimates  **DS:**  Analyzing Data, Stats  **KS:**  Applying Scientific Knowledge | 1. **SF video:** [Water](https://youtu.be/SdrKP-3Qpzw) 2. **Reading:** Chapter 13: Water Availability and Use *from* Doršner. 2015. [Essentials of Environmental Science.](http://www.ck12.org/user:zg9yc25lckbnbwfpbc5jb20./book/Essentials-of-Environmental-Science/) 3. **Reading:** Chapter 2: Descriptive Statistics *from* OpenStax. [*Introductory Statistics*.](https://openstax.org/details/books/introductory-statistics) OpenStax. 19 July 2013.   **OPTIONAL Reading:** NYC DEP. [NYC 2017 Drinking Water Supply and Quality Report](http://www.nyc.gov/html/dep/pdf/wsstate17.pdf).  **OPTIONAL Video:** Science 360: Sustainability: Water Series [The Ogallala Aquifer](http://science360.gov/obj/video/6d8a2e02-0936-47d8-b2f4-3833c63d11ad/sustainability-water-ogallala-aquifer) and [Los Angeles and Water Imports.](http://science360.gov/obj/video/3460a5b7-c231-442b-b828-37bd521eb31e/sustainability-water-los-angeles-water-imports)  **OPTIONAL Reading:** Pimentel et al. 1997. [Water Resources: agriculture, the environment, and society](http://www.kysq.org/docs/Pimentel97.pdf). *BioScience.* 47(2):97-106. | * **Self-Assessment 8** * **Discussion 8** * **Activity 8** – Poster Annotated Bibliography * **Optional Activity -**  Essay revision |
| 9 | **Energy**  **NS:** Estimates  **DS:**  Analyzing Data, Hypothesis testing  **KS:** Making Evidence-based Arguments**,**  Making Progress in Science | 1. **SF video:** [Energy](https://youtu.be/Cbn83mBu9zo) 2. **Video:** [SciShow: Facts About Fracking](https://www.youtube.com/watch?v=51wOisfdIPo) 3. **Reading:** Harris M, G Taylor, & J Taylor. 2007. *CatchUp Math and Statistics for the Life Sciences*. New York: WH Freeman and Company. Ch. 33 and 34. 4. **Reading:** Muller RA. 2008. Ch 5: Key Energy Surprises *from* Physics for Future Presidents. New York: WW Norton. Pgs. 65-76. [pdf]   *Watch only one of these (to be assigned in class):*  **Video:** [Green Revolution: Hydrogen](http://science360.gov/obj/video/e6c0e1eb-0706-4854-9663-0806b14b2799/green-revolution-hydrogen)  **Video:** [Green Revolution: Biomass](http://science360.gov/obj/video/86752499-f847-4458-bcd9-29ec98b2e060/green-revolution-biomass)  **Video:** [Green Revolution: Wind Power](http://science360.gov/obj/video/de111fd3-5fb6-49ae-a02f-11558b417011/green-revolution-wind-power)  **Video:** [Green Revolution: Solar Power](http://science360.gov/obj/video/cb617b37-4eb5-4518-b44a-da0b7d0190e0/green-revolution-solar-power)  **Video:** [Green Revolution: Microbes](http://science360.gov/obj/video/19569fc2-431e-455d-9642-3473fb4e44ac/green-revolution-microbes) | * **Self-Assessment 9** * **Discussion 9** * **Activity 9** – Poster Figures and Main Results |
| **Week** | **Topic** | **Video/Reading** | **Assignment** |
| 10 | **Neuroscience**  **DS:**  Analyzing Data, Proxies  **KS:**  Designing experiments | 1. **SF video:** [Animal Communication](https://youtu.be/svx0lq_ILOQ). 2. **Reading:** [ArriagaZhouJarvis2012](http://macaulay.cuny.edu/eportfolios/odonnell15/readings/arriagazhoujarvis2012/)  “Of Mice, Birds, and Men: The Mouse Ultrasonic Song System Has Some Features Similar to Humans and Song- Learning Birds” 3. **Video:** Science360: [Mind Mappers](http://science360.gov/obj/video/91c5b32a-e68b-468b-93bc-25a8067a4167/mind-mappers-mapping-brain-understand-mind) 4. **Reading:** Neuroimagine: Visualizing Brain Structure and Function (Read sections 2, 3, 4.2 and 4.3) from the OER *Neuroethics* by Haberfeld *et al.* [Link here](http://ccnmtl.columbia.edu/projects/neuroethics/module1/foundationtext/index.html#2.)   **OPTIONAL Reading:** Chapter 35: The Nervous System *from* OpenStax, *Biology*. OpenStax. 21 October 2016. | * **Self-Assessment 10** * **Discussion 10** * **Activity 10 -** Video |
| 11 | **Intelligence**  **DS:**  Making Measurements, Collecting and Analyzing Data, Stats, Proxies, Uncertainty, Recognizing Bias  **KS:**  Applying Scientific Knowledge, Ethics | 1. **SF video:** [Artificial Intelligence](https://youtu.be/nk2KSwwgQJ4). 2. **Reading:** Levesque. 2013. On our best behavior. From the IJCAI-13 Conference. 3. **Reading:** Folger T. 2012. Can we keep getting smarter? Scientific American 4. **Reading:** [Chapter 7: Thinking and Intelligence](https://cnx.org/contents/Sr8Ev5Og@5.101:3DT0XBfK@4/Introduction) *from* OpenStax, *Psychology*. OpenStax. 14 February 2014. | * **Self-Assessment 11** * **Discussion 11** * **Activity 11** – Poster Draft |
| 12 | **Drug Discovery &**  **Development**  **KS:**  Using Models, Applying Scientific Knowledge | 1. **SF video:** [Drug Discovery and Development.](https://youtu.be/Gu0knOtpAE8) 2. **SF video:** [Cancer](https://youtu.be/oP4WGnzCHIw) 3. **Video:** TED talk: [Collins – We need better drugs now](http://www.ted.com/talks/francis_collins_we_need_better_drugs_now.html). 4. **Reading:** Gorson and Holford. 2016. Small Packages, Big Returns: Uncovering the Venom Diversity of Small Invertebrate Conoidean Snails. *Integrative and Comparative Biology.* 56(5):962-972. 5. **Reading:** [Chapter 3](https://cnx.org/contents/GFy_h8cu@10.118:7mHTlb7m@4/Introduction): Biological Macromolecules *from*OpenStax. Biology. 21 October 2016. | * **Self-Assessment 12** * **Discussion 12** * **Activity 12 –** molecular discovery * **Optional activity –** video revision |
| **Week** | **Topic** | **Video/Reading** | **Assignment** |
| 13 | POSTER  PRACTICE | *No readings. You will be presenting your poster virtually to a subset of the class.* | * **Self-Assessment 13** * **Discussion 13** * **Activity 13 -** Second poster draft |
| 14 | **Medicine and Pseudo-medicine**  **DS:**  Analyzing Data, Interpreting Graphs  **KS:**  Designing Experiments, Ethics, Distinguishing Science from Pseudoscience | 1. **SF Video:** [Cancer](https://macaulay.cuny.edu/eportfolios/scienceforward/portfolio/cancer/) 2. **Video:** [Placebos & Nocebos: How Your Brain Heals and Hurts You](https://youtu.be/rtPe5lsoHXY) 3. **Reading:** Garber, K. 2009. Melanoma drug vindicates targeted approach. *Science*. 326:1619. 4. **Video:** Science360: 21st Century Scientists: [Facundo Fernandez](https://www.nsf.gov/news/mmg/mmg_disp.jsp?med_id=74551&from=) 5. **Reading:** Chapter 26 from Bad Medicine by Christopher Wanjek 6. **Reading:** FDA Drug Review Process website. Be sure to look at both the text on these two pages and the infographic. Go to [Page 1](http://www.fda.gov/Drugs/ResourcesForYou/Consumers/ucm143534.htm) AND [Page 2](http://www.fda.gov/Drugs/ResourcesForYou/Consumers/ucm289601.htm)   **OPTIONAL SF Video:** [Science and Ethics](https://macaulay.cuny.edu/eportfolios/scienceforward/portfolio/ethics/) | * **Self-Assessment 14** * **Discussion 14** * **Activity 14** – Fake medicine hunt |
| 15 | **Science and Society**  **KS:** Nature of Science | 1. **Reading:**“Science and Society” and “What has science done for you lately?” in the UC Berkeley’s Understanding Science OER. [link here](https://undsci.berkeley.edu/article/0_0_0/scienceandsociety_01) (it’s 5 pages to click through for the first part and then 7 pages to click through for the second). | * **Self-Assessment 15** * **Discussion 15** * **Activity 15 –** science resolutions |